National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET 9948 (DSI-9948)

SIX SECOND UPPER AIR DATA

January 6, 2003

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

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Table of Contents

1. Abstract: This data set consists of high resolution 6-second data recorded by the National Weather Service (NWS) operational upper-air observing system. Upper-air observations are usually made twice daily at 00 U.T.C. and 12 U.T.C. hours. The station network consists of approximately 100 observing sites over the U.S. and U.S. territories. Generally, stations are spaced so that the distance between stations is about 200 miles within the contiguous United States. These sites use the MicroArt sounding system to process and record the radiosonde flight. The MicroArt System records temperature, pressure, humidity, and balloon position every six seconds for the duration of the radiosonde flight. The MicroArt also reduces the sounding to mandatory and significant level data. The NWS field sites routinely send the NCDC their upper-air observations for mandatory and significant levels for quality control and permanent storage. They forward these data to the NCDC on low-density 5 1/4" or high-density 3 1/2" diskettes at the end of each month.

The data (except for winds aloft) are averaged for every six seconds using data received every 250th of a second throughout the flight.

Whole-minute winds aloft are calculated from the change in the balloon's position, generally over a four-minute averaging interval and a two-minute overlap. For example, the wind direction and speed for an elapsed time of 56.0 minutes is calculated using the change in the balloon's position between minutes 54.0 and 58.0 minutes; winds for minute 57.0 use positions at 55.0 and 59.0 minutes. In some instances the winds aloft are calculated using a one-, two-, or three-minute averaging interval, e.g., the first whole-minute wind above the surface, winds bounding levels of missing data, and the terminating wind. The method for calculating the wind speed makes adjustments for these averaging intervals.

The winds aloft archived for those elapsed times at other than whole minutes, i.e., winds at each thermodynamic level, are interpolated using the elapsed time and the wind (polar direction and speed converted to Cartesian coordinates) of the bounding whole-minute winds.

In April 1995, the NCDC agreed to a request by the NWS to convert (binary to ASCII) and archive the full temporal resolution (six second data) MicroArt data on an operational basis. The NWS sends these data to the NCDC as packed binary files. The NCDC Data Operations Branch has developed the PC/work-station-based Upper-Air Data Assimilation System (UDAS) to convert this new data stream to a format more suitable for archiving and dissemination to a variety of users. The high resolution upper-air diskettes begin arriving at NCDC within one to two days after the data-month. All or most of the diskettes arrive within two weeks after the data-month.

2. Element Names and Definitions: Each record is divided into an Identification (ID) portion (20 characters) and a Data portion (60 characters). The 20-character ID portion is prefixed to the archive data by the UDAS. The ID portion can be further subdivided as follows:

Station Id	Year	Month	Day	Hour	Flight Number	Sequence Number
XXXXX	XXXX	XX	XX	XX	X	XXXX

The data portion consists of 60 characters which is converted directly from the packed binary format on the input diskettes. The data portion is basically in a print format with the following sub-headings:

"FILE HEADER RECORD"

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"FILE INDEX RECORDS"
"STATION DATA RECORD"
"LIMITING ANGLES DATA"
"PRERELEASE ADMINISTRATIVE DATA"
"PRERELEASE FLIGHT EQUIPMENT DATA"
"SURFACE OBSERVATION DATA"
"VIZ RADIOSONDE CALIBRATION DATA"
"VIZ PRERELEASE DATA"
"RELEASE DATA"
"VIZ PRESSURE CONTACT LOG"
"TERMINATION SUMMARY DATA"
"VIZ RADIOSONDE CONTACT PRESSURE CALIBRATION DATA"
"6 SECOND MET DATA"
"POSITION DATA"

The data portion may not contain all of these sub-headings depending on the success of the radiosonde flight. It is suggested that the user of these data examine the records from a few radiosonde flights in order to better understand the data portion of this archive.

Station Id - This is a five character numeric station number assigned by the National Climatic Data Center. It consists of WBAN #. (The WMO # is available in the first record of each flight).

Year - This is the year of record. Range of values is 1995 through the current year archived.

Month - This is the month of record. Range of values is 01-12.

Day - This is the day of record. Range of values is 01-31.

Hour - This is the hour of record. Range of values is 00-23 Greenwich Mean Time. The more common radiosonde release times are 00 and 12 hours.

Flight Number - This is the number of the radiosonde flight. Usually there is only one flight for the a particular Station Id, Year, Month, Day, and Hour. However, if problems occur with the first flight, a subsequent flight may be made. Range of values is 1-9.

Sequence Number - This is the numerical sequence of the records generated from each radiosonde flight that was archived on diskette. Range of values is 0-9999. This parameter is used to maintain the same sequence, or order of the records, that were archived on diskette should the data be sorted.

DATA PORTION

"FILE HEADER RECORD" - This group of records consists of various high-level descriptive information about the file

"FILE INDEX RECORDS" - This group of records pertains to the input packed binary file on diskette. These records are not directly applicable to the ASCII archive file.

"STATION DATA RECORD" - This group of records contains metadata describing the station number, name, elevation, latitude, longitude, etc.

"LIMITING ANGLES DATA" - This group of records contains the lowest elevation angle at each whole degree of azimuth that the radiosonde can be tracked (ie. the antenna cannot be lower than this angle)

"PRERELEASE ADMINISTRATIVE DATA" - This group of records contains metadata describing the observer, release date and time, ascension number, etc.

"PRERELEASE FLIGHT EQUIPMENT DATA" - This group of records contains metadata describing the radiosonde, balloon, parachute, etc.

"SURFACE OBSERVATION DATA" - This group of records contains the surface meteorological conditions at the release time of the radiosonde flight.

"VIZ RADIOSONDE CALIBRATION DATA" - This group of records contains metadata describing the calibration data of the radiosonde instrument. The calibration is performed by the manufacturer.

"VIZ PRERELEASE DATA" - This group of records contains metadata describing data settings applicable when the radiosonde instrument is released.

"RELEASE DATA" - This group of records contains release time information and pressure information at release time.

"VIZ PRESSURE CONTACT LOG" - This group of records contains pressure contact log information.

"TERMINATION SUMMARY DATA" - This group of records contains metadata describing the reason for termination of the flight, termination altitude, etc.

"VIZ RADIOSONDE CONTACT PRESSURE CALIBRATION DATA" - This group of records contains pressure in tenths of hectoPascals (millibars), calibrated for each pressure contact.

"6 SECOND MET DATA" - This group of records contains the meteorological data every 6 seconds during the radiosonde flight.

"POSITION DATA" - This group of records contains the information describing the elevation, azimuth, and slant range (if applicable) every 6 seconds during the radiosonde flight.

3. Start Date: 19950401

4. Stop Date: Ongoing.

5. Coverage: Areal coverage includes the contiguous United States, Alaska, Caribbean Islands, Pacific Islands, and other overseas stations operated in agreement with the NWS.

a. Southernmost Latitude: 14S
b. Northernmost Latitude: 71N
c. Westernmost Longitude: 171W
d. Easternmost Longitude: 171E

6. How to Order Data:

Ask NCDC's Climate Services about the cost of obtaining this data set.
Phone: 828-271-4800
FAX: 828-271-4876
E-mail: **NCDC.Orders@noaa.gov**

7. Archiving Data Center:

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: (828) 271-4800.

8. Technical Contact:

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: (828) 271-4800.

9. Known Uncorrected Problems: No known uncorrected problems.

10. Quality Statement: Responsibility for data quality rests with the individual observers and the operating algorithms used by the MicroArt system. NCDC does no QC on this data set.

11. Essential Companion Datasets: None.

12. References:

National Weather Service Observing Handbook No. 3, Upper Air Observations, NOAA-NWS, Silver Spring MD.

MicroArt Training Manual